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SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal

Lancaster, Pa. — Garrison, N. Y.

Annual Subscription, $6.00 — Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

# COMMENTS ON CLINICAL INVESTIGATION[1]

By Dr. ROBERT F. LOEB

COLLEGE OF PHYSICIANS AND SURGEONS, COLUMBIA UNIVERSITY

I HAVE been sorely tempted to follow the becoming example of a predecessor and forego the generalizations which are expected to serve as a forerunner to the serious purpose of these meetings. However, I can not refrain from taking this opportunity to comment briefly upon certain considerations of clinical investigation which are assuming progressively greater importance. These criticisms and pleas are primarily directed towards laboratory investigation, although they incidentally also apply to those phases of clinical research which deal with bedside observation and the statistical study of clinical material. Moreover, my remarks are concerned only with those endeavors which are genuine and sincere. Investigation undertaken either consciously or subconsciously for the purpose of advertising or for personal aggrandizement is not worthy of comment before this group.

Keeping pace with the spirit of abandon which characterized the florid twenties, clinical investigation ran riot, recognizing no bounds, philosophical, intellectual, technical or financial. With apparently unlimited financial resources, the business man's concept of mass production tended to creep into academic medical circles without due appreciation of the differences in the aims of business and of science. Under this spell of enthusiasm it seemed reasonable to expect that with organized groups of investigators, spacious laboratories, endless equipment and technical assistance the mysteries of medical science must bow before the concerted onslaught and bow promptly. Medical students and young graduates, without consideration

[1] From the Department of Medicine, College of Physicians and Surgeons, Columbia University, and the Presbyterian Hospital, New York City. Presidential address delivered before the American Society for Clinical Investigation, on May 4, 1936.

of "Geist" or other qualifications, were urged to enter laboratories. They might cooperate in the contemplated discovery of the etiology of cancer or they might be set the task of counting paving blocks—it was immaterial, but all in the name of science.

The sobering effect of the economic crash upon industrial and financial structures has had far-reaching repercussions and has been seriously felt in most of the clinics of this country. The problem of curtailment and economy has involved all those interested in clinical investigation and we are now confronted with the inevitable and healthy task of taking account of stock and separating the wheat from the chaff. In other words, we must decide what, out of this great orgy of clinical investigation, is most worthy of salvage.

There is no doubt that what we desire to save above all else is that backlog of solid and profitable research which has continued to advance medical science and which may be defined as a product of thoughtful and critical curiosity supported by ingenuity in experimentation. Whether or not the results are of immediate practical value is relatively unimportant, but that the stimulus to investigation should be a query either of fundamental or of practical significance is vital. Of two general approaches to research, experience has shown time and again through the ages that the outstanding advances in the realm of science have resulted from the efforts of individual investigators possessing the spark essential for creative work. To be sure, in this approach the full harvest of results may frequently be reaped only through the subsequent cooperation of others better versed in various technical aspects of the problem, but the fact remains that it is the individual investigator whose creative force furnishes the opening wedge. It is, consequently, this rare individual who above all is to be treasured and who deserves the support necessary to enable him to exercise his powers to the full.

The largest group interested in clinical research is composed of individuals, many of whom are the clinical teachers responsible for the development of critique and a point of view among students of medicine. These investigators share in common one characteristic, namely, that of intellectual curiosity; they perceive the significance of fundamental observations and are frequently able to extend them, but their capacities for critical and thoughtful experimentation naturally cover a range so wide that the products of their scientific endeavors, while often good, are more frequently indifferent and occasionally very bad. Nevertheless, the progress of medical science is greatly enhanced by these gleaners. Consequently they, too, deserve encouragement and should continue to receive financial support. However, the time has come when the qualifications of the recruits for this class of investigators should be scrutinized meticulously, because it is the futile efforts of the many lesser lights among these gleaners which lead to untold waste.

Another approach to clinical investigation has been developed in recent years and lies in sharp contrast to that already described. This is the *research project* which demonstrates in its point of view total ignorance of the means by which science has advanced. It attempts to force progress through regimentation of workers who lack the essential critical curiosity in the subject under investigation and it stifles the untrammeled play of imagination which often seizes upon a most significant by-product in the course of individual research. It is not the product of creative thought, but is usually initiated by energetic and misguided promoters inspired by the effectiveness of mass production in big business. It involves the wasteful expenditure of large sums of money. In other words, it assumes that scientific knowledge can be bought, and that dollars give birth to ideas. The research project in clinical medicine has proven consistently barren and has resulted in the disbursement of funds which, if applied to the endowment of individual investigators or university departments where creative thought is fostered, may reasonably be expected to further the progress of science. Hence I make my plea for the support of those individuals engaged in fruitful research, for the reapportionment of the limited funds available for clinical investigation and for their direction into recognized productive channels.

# THE HISTORY OF SCIENCE SOCIETY AND THE DAVID EUGENE SMITH FESTSCHRIFT

By FREDERICK E. BRASCH and LAVADA HUDGENS
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IN January there appeared before the intellectual world another of those unique historical works known as a Festschrift, a term which ordinarily connotates a collection of essays, written by scholars commemorating the service of another scholar. In America we do not follow this procedure as much as scholars in Europe have done. Nevertheless, it is indeed an excellent expression of appreciation and method of honoring those to whom honor is due.

On January twenty-first, the seventy-sixth anniver-

sary of the birthday of Dr. David Eugene Smith was celebrated at Columbia University. This celebration took the form of a tea, attended by a group of his intimate friends, associates and students. The occasion for the tea, unknown to Dr. Smith, was the presentation of a collection of essays, beautifully bound, commemorating his great service in the field of the history of mathematics and science in general. Dr. George Sarton, editor of *Isis* (an international journal devoted to the study of the history of science), with a few well-chosen words, presented the Festschrift to Dr. Smith. The real significance of this particular volume is all so well stated in the preface and contents that only a list of contributors need be given here. The Festschrift contains 38 studies on the history of mathematics and the history of science, which illustrate admirably the richness and manysidedness of these studies. Most of the papers are in English, a few in French, German, Italian and Spanish. Those contributing are: Raymond Clare Archibald, Providence, R. I.; Sherman B. Barnes, New York; Charlotte H. Boatner, New Orleans, La.; Ettore Bortolotti, Bologna; Julian L. Coolidge, Cambridge, Mass.; George O. S. Darby, Greenwich, Conn.; H. Gray Funkhouser, Exeter, N. H.; Solomon Gandz, New York; F. H. Getman, Stamford, Conn.; Benjamin Ginzburg, Long Island City, N. Y.; C. Doris Hellman, New York; Theodore Hornberger, Ann Arbor, Mich.; S. A. Ionides, Denver, Colo.; Francis R. Johnson, Palo Alto, Calif.; L. C. Karpinski, Ann Arbor, Mich.; Gino Loria, Genoa; J. Millás i Vallicrosa, Barcelona; U. G. Mitchell and Mary Strain, Lawrence, Kansas; J. Pelseneer, Bruxelles; A. Pogo, Washington, D. C.; Vera Sanford, Oneonta, N. Y.; P. Sergescu, Cluj; Lao G. Simons, New York; A. N. Singh, Lucknow, India; Lynn Thorndike, New York; J. Tropfke, Berlin; D. Uvanovic, Zagreb, Jugoslavia; A. Van de Vyver, Gand; Q. Vetter, Prague; K. Vogel, München; J. A. Vollgraff, Leiden; Helen M. Walker, New York; P. P. Wiener, New York; E. Zinner, Bamberg. The first article, which was prepared by Bertha Margaret Frick, librarian, is an exhaustive bibliography of the critical, historical and pedagogical writings of David Eugene Smith, together with an account of the mathematical library which Dr. Smith presented to Columbia University in 1931. This Festschrift is the first volume of the new series called "Osiris." It contains 800 pages, 22 plates, 35 facsimiles and 24 figures, and was edited by Dr. George Sarton.

Dr. Smith's great service to the history of intellectual progress in the United States is not to be found alone in his many books and monographs, or in the collection of mathematical manuscripts, portraits, instruments and incunabula, through which he has left a concrete and invaluable monument to the university he has served so long, but also in the advancement of the humanistic or cultural movement in the sciences.[1] The history of this cultural movement in the United States, namely, the history of science, has been long and varied, from the time its influence first became felt through the works of Joseph Priestley's two large volumes on "The History of Electricity" and "Vision and Light" to Andrew D. White's "The Warfare of Science and Religion."

While we have had a great many books treating of the various phases of the history of science, we must also recognize the work of pioneer scholars who began offering courses in our colleges and universities around 1890. The outstanding men whose teachings, writings and efforts toward collecting source material paved the way for the organization of a definite cultural movement are: Florian Cajori, William A. Locy, W. H. Welch, E. F. Smith, T. W. Richards, Henry Crew, H. W. Tyler, L. J. Henderson, Walter Libby, C. R. Cross, J. Playfair McMurrich, Herbert M. Evans and David Eugene Smith.[2] It was not until 1916, when Dr. George Sarton transferred his permanent residence from Belgium to this country, bringing with him his newly established publication, *Isis*, that the influence of the history of science studies became recognized. The coming of Dr. Sarton and *Isis* was the inspiration needed to crystallize the movement in this country.

The first definite step was taken by the American Association for the Advancement of Science and the American Historical Association, who, taking cognizance of the efforts being made by a few prominent scholars and interested students, formulated plans for organizing this movement.[3]

The development of these various phases of growth became so marked that some sort of central organization was found necessary to foster them. Through the far-sighted effort and untiring interest of Dr. David Eugene Smith was brought about the founding of The History of Science Society in 1924, which, by the end of that year, had reached a membership of 500. The geographical distribution of these 500 foundation members was such as to establish an international character for the society.

The society was organized in Boston on January 12, 1924, and was incorporated under the laws of the District of Columbia on January 30, 1925. It was affiliated with the American Association for the Advancement of Science on April 26, 1925, and admitted as a constituent member of the American Council of Learned Societies, on February 2, 1927. The society

[1] SCIENCE, n.s., 83: 79–80, 1936.
[2] SCIENCE, n.s., 42: 746–760, 1915.
[3] *Ibid.*, 50: 66–68, 1919; *ibid.*, 52: 559–562; *ibid.*, 53: 315–318.

meets annually, usually with the American Association for the Advancement of Science or the American Historical Association, and participated actively in the second International Congress of the History of Science and Technology in London in 1931.

The History of Science Society is now entering upon its thirteenth year of activity, and although it is one of the youngest of the learned societies, the interest shown in it at the outset continues unabated. This interest was such that the initial membership has grown to over 700. It is hoped that the earnest support thus far accorded may eventually lead to the endowment of *Isis* and even to that of the society itself.

It may also be observed that the society is the first, on any large scale, to afford a common meeting ground for scientists, historians and philosophers. Indeed, the study of the history of science seems to provide the only feasible method for bridging the widening gap between men of science on the one hand and men of letters on the other.

The annual programs of the society have been carefully prepared, and consequently have been the means of fostering some notable and original contributions. Probably the most outstanding programs were the following: the commemoration of the Bicentenary of the death of Sir Isaac Newton (1642–1727) given in November, 1927, and the Tercentenary Commemoration of the death of Johann Kepler given in 1931, both of which have been published. Another program of importance and one which invoked considerable interest was entitled "The History of Medicine and Civilization," given in 1928.

*Isis*, the official journal of the society, is a quarterly publication of international character and is edited by Dr. George Sarton, research associate of the Carnegie Institution of Washington, with the cooperation of eleven associate editors, each representing various fields of learning. This periodical is devoted to the history of science in its broadest aspects, and receives contributions from scholars in almost every branch of historical learning throughout the world. A helpful feature of the publication is the annotated bibliographical contributions, which are arranged both by period and by subject, so that a scholar wishing to work in special branches or in certain epochs of scientific development finds his material already assembled. The reviews are by noted specialists in their respective fields and form one of the most important features of the journal.

In addition it publishes facsimiles of the great classics in the history of science; for example, Sir Isaac Newton's original communication to the Royal Society of London on his "New Theory about Light and Colors," and also the first joint communication of Charles Darwin and Alfred Wallace on "The Perpetuation of Varieties and Species to Form Varieties" and on "The Perpetuation of Varieties and Species by Natural Means of Selection." The illustrations accompanying the original articles, including portraits, have much historical value, and it is the desire of the editor to enlarge upon this feature in future numbers. The society is now publishing the twenty-fourth volume of *Isis*.

The society also undertakes to publish from time to time through its revolving book fund, granted by the Carnegie Corporation of New York, important contributions in the field of the history of science, which are not within the scope of commercial publishing firms. The following are the titles of the new series thus far published: "The Black Death and Men of Learning," by Anna Montgomery Campbell, 1931; "Correspondence and Papers of Edmond Halley, Preceded by an Unpublished Memoir of His Life by One of His Contemporaries," and the "Eloge," by D'Otrous de Mairan, edited by Eugene Fairfield MacPike, 1932; De Venarum Ostiolis 1603 of Hieronymus Fabricius of Aquapendente (1553?–1619), Facsimile Edition with Introduction, Translation and Notes, by K. J. Franklin, 1933; "The Background of Modern Science," 2 volumes, by Lynn Thorndike, 1934; "Scientific Organizations in Seventeenth Century France (1620–1680)," by Harcourt Brown, 1934; "Jöns Jacob Berselius, Autobiographical Notes," published by The Royal Swedish Academy of Sciences through H. G. Söderbaum and translated from the Swedish by Olof Larsell, 1934; "The Modernization of the Medical Sciences," by Dr. Richard H. Shryock, 1936 (in press).

It is very evident from the foregoing account that the history of science movement, together with the present influence and progress of this society, have combined to build for Dr. Smith a monument which his fondest hopes did not envision. The intellectual world owes him a great debt, and the officers of this society take this opportunity to acknowledge that indebtedness and to offer him their congratulations.

# SCIENTIFIC EVENTS

## ACQUISITION OF BULL ISLAND FOR A BIRD REFUGE

BULL ISLAND near Charleston, S. C., has been bought by the U. S. Biological Survey for a bird refuge. The island is part of a land-and-water tract of about 7,700 acres which has been added to the 55,000-acre Cape Romain Migratory Bird Refuge in South Carolina. The new purchase brings the water frontage of Cape Romain Refuge to about 25 miles.

Except as a haven for wildlife, for which it is well

adapted, Bull Island has had an unprofitable history over 250 years. It has repeatedly failed as a cotton plantation, becoming later a timber reserve.

A wooded hill ten miles long and four miles wide on an average, the island is some eighteen miles northeast of the port of Charleston. The Atlantic lies off its outer shore. The inner shore overlooks a waste of marsh grasses and tidal currents out of which, after some miles, the solid farming land of Charleston County emerges.

As far back as colonial days chroniclers remarked upon, and attempted to classify, the flocks of wild fowl which frequented the fresh-water ponds that dotted the island. In 1935, after a lapse of hundreds of years, an agent of the Biological Survey, recommending the purchase of the property by the government for the uses of wildlife, noted that the center of the island is still a primeval forest where a great variety of birds can be found throughout the year.

Some of the most frequent visitors to the refuge are the great blue heron, the American egret, the snowy heron, the green heron, the Louisiana heron, the black-crowned night heron, the long-billed and Hudsonian curlews, the laughing and the ring-billed gulls, plovers of many species, the oyster catcher, the brown pelican and the royal tern. Besides these and other birds which frequent the area, Bull Island is a haven for ducks of many species, wild turkey, shore birds, deer and wild hogs. Canvasbacks are found there in considerable numbers, this being probably their southern flight limit in large flocks, on the Atlantic coast.

Among the hundreds of thousands of acres of submarginal land recently taken over in various parts of the country by the Biological Survey as nesting and feeding grounds for wildlife, Bull Island stands out as an area in which animals are still abundant. Most of the newly acquired areas have been partially or wholly deserted by birds and four-footed game and must be restored as havens.

Measures to maintain the attractions to wildlife on the island and to facilitate its administration as a sanctuary are now being carried out by the survey. Sand ridges on the outer shore of Bull Island will be rebuilt. Fresh-water ponds on the island will be newly dyked and impounded. Some new aquatic plants which have been established elsewhere as a natural duck-food will be imported and sown. Radio telephones are contemplated as a connection between the island and the refuge headquarters on the mainland ten miles away. General improvements being made on the entire Cape Romain Refuge include new docks projected both on Bull Island and on the mainland.

## SUMMER CONFERENCES ON SPECTROSCOPY AND COLOR AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

THE Massachusetts Institute of Technology has recently announced a special summer program on applied physics which will feature a conference on spectroscopy and its application, to be held on July 20, 21 and 22, and a conference on color to be held on July 23, 24 and 25. These two conferences have been planned as a unit, since the two subjects are closely related.

During the first three days of the week, morning and afternoon sessions will be held, with discussions by qualified experts on spectroscopic analysis of materials, and on other applications of spectroscopy to biology, medicine, chemistry, metallurgy, mineralogy and to industrial and engineering problems.

During the Color Conference, morning and afternoon meetings will be held with discussions by eminent authorities on the subject of color and its various applications. This conference will be devoted to spectrophotometry, colorimetry and the applications of color measurements to industrial problems. Detailed consideration will be given to the behavior and control of the color of dyes and pigments, and their application in such fields as the paint, ink, paper, textile and the ceramics industries.

These conferences come at the conclusion of the courses on spectroscopic analysis of materials which are being offered during the six weeks from June 16 to July 24. These deal principally with applications of spectroscopy to biology, chemistry, geology, metallurgy, physics and other branches of science.

There is no charge for attendance at the meetings of the conferences, copies of the detailed programs of which will be sent on request to any one interested. The object of the conferences is to promote cooperation between investigators in different fields who have found or may find useful the technical methods of spectroscopy and color. Information in regard to the conferences should be addressed to Professor G. R. Harrison, of the department of physics.

## THE WASHINGTON CONFERENCE ON THEORETICAL PHYSICS

SCIENTIFIC men from American and foreign universities gathered in Washington on Monday, Tuesday and Wednesday, April 27, 28 and 29, for the second Washington Conference on Theoretical Physics under the joint auspices of the Carnegie Institution of Washington and the George Washington University.

These annual conferences are an outgrowth of the

researches in fundamental physics begun some years ago by the Carnegie Institution and the work which is being done at the George Washington University. Dr. M. A. Tuve and Dr. L. R. Hafstad, of the Department of Terrestrial Magnetism, and Dr. Gregory Breit, Jr., formerly of the department and now at Princeton University, are in charge of the work in this field at the Carnegie Institution; while at the George Washington University it is in charge of Dr. George Gamow, professor of theoretical physics, and Dr. Edward Teller, visiting professor of theoretical physics.

Dr. Gamow, formerly of the Institute of Mathematical Physics and the Academy of Sciences at Leningrad, is the pioneer in the theoretical investigation of atomic nuclei and first formulated the modern theory of radioactivity. Dr. Teller is a Hungarian theoretical physicist whose researches, devoted to the theory of molecule-structure and the dynamics of chemical reaction, are of great significance to experimental chemists in the field of physics and chemistry. Both Dr. Gamow and Dr. Teller have worked at the principal European centers—at Munich with A. Sommerfeld, at Copenhagen with Nils Bohr, at Leipzig with W. Heisenberg and at Göttingen with Born. Before going to the George Washington University last fall Dr. Teller spent a year at the University of London working with Dr. F. G. Donnan.

Among those who attended the conference were: Linus Carl Pauling, California Institute of Technology; Robert S. Mulliken, University of Chicago; Harold Urey, Columbia University; G. Placzek, Institute of Copenhagen; Hans A. Bethe, Cornell University; Hertha Sponer, Duke University; Irving Langmuir, the General Electric Company; Hubert Maxwell James, Edwin Crawford Kemble, J. H. Van Vleck and E. Bright Wilson, Jr., Harvard University; James Holley Bartlett, University of Illinois; Donald Hatch Andrews, Gerhard Heinrich Dieke, James Franck, Karl Ferdinand Herzfeld, Maria Goeppert Mayer, Joseph Edward Mayer, the Johns Hopkins University; John Clarke Slater and George E. Kimball, Massachusetts Institute of Technology; David Mathias Dennison, University of Michigan; Gregory Breit, Edward Uhler Condon, Henry Eyring, R. H. Fowler and Hugh Stott Taylor, Princeton University; Lothar Nordheim and Gertrude Nordheim, Purdue University; Eugene Paul Wigner, University of Wisconsin.

Topics discussed included: Chemical bond, reaction velocities, magnetism, Van der Waal's forces, molecular vibrations and isotopes.

## CENTENNIAL CELEBRATION OF THE PENNSYLVANIA GEOLOGIC SURVEY

THE first Pennsylvania Geologic Survey was created by act of the Legislature on March 29, 1836. In commemoration of the centennial, a fitting celebration is to be held at Harrisburg on Friday and Saturday, June 12 and 13. Delegates and invited guests will register on Friday morning at the survey offices, on the sixth floor of South Office Building. Here will be seen an exhibit of the progress of geologic work in the state, publications and maps of the four surveys, collections of fossils, rocks and minerals, and other matters of geologic interest. Tours of the capitol, the State Museum and other buildings and of the capitol grounds will be arranged.

The official program will open at 1:30 on Friday afternoon in the forum of the Education Building with addresses of welcome from state officers. These will be responded to by representatives of various geologic organizations. Two addresses are to follow, the one dealing with early scientific work in Pennsylvania, and the second with the development of geology in the state, particularly, the work of the survey. A reception to delegates and invited guests is to follow the formal program. Friday evening will be devoted to a symposium, "The Relation of the Mineral Industry to the Geologic Survey," in which leading authorities in various fields will participate.

On Saturday, June 13, field excursions in the vicinity of Harrisburg will be conducted. A choice of three is offered. The region is particularly interesting with its examples of Paleozoic stratigraphy ranging from the Cambrian through the Pennsylvanian. The Triassic sediments and igneous rocks are well exposed south of the city, and the crystallines of South Mountain are within easy reach. Much of interest to the economic geologist and mineralogist is at hand. The region is also of great physiographic interest, and Appalachian structures are beautifully illustrated, particularly in the Susquehanna and Juniata valleys. Following the field trips, tea will be served at the residence of the state geologist. Visiting ladies may participate in the field trips, but for those desiring to remain in Harrisburg, entertainment will be provided.

Hotel reservations should be made personally. The Penn-Harris and Harrisburger offer first-class accommodations, and many smaller hotels are available. Communications should be addressed to the State Geologist, Department of Internal Affairs, Harrisburg, Pa.

BRADFORD WILLARD

## THE TWENTY-FIFTH ANNIVERSARY OF THE NEW YORK STATE COLLEGE OF FORESTRY

THE twenty-fifth anniversary of the founding of the New York State College of Forestry at Syracuse University, of which Dr. Samuel N. Spring is dean, was

celebrated on April 29 when a convocation was held in which speakers representing faculty, alumni and the university administration participated.

The alumni cooperated in making the celebration a success by holding special smokers and gatherings in various sections of the country. The first of these was held in New York City on April 24, when former Governor Alfred E. Smith, president of the board of trustees; Senator J. Henry Walters and George W. Sisson, also members of the board; Chancellor Charles W. Flint, Dean Samuel N. Spring and Dr. Hugh P. Baker, now president of Massachusetts State Agricultural College, were the speakers.

The institution opened in 1911 with the registration of fifty-two students. Dean William L. Bray, now head of the Graduate School at Syracuse University, was in charge for the first and part of the second semesters. The school at that time occupied a corner in the basement of Lyman Hall when Dr. Hugh P. Baker was brought from Penn State Forest School to take charge. He placed the college on a solid foundation and laid plans for its future development which have been largely fulfilled under his administration and that of the late Dean Franklin Moon. A large building was erected on the campus by state appropriations and occupied in 1917. Another building was constructed for housing the scientific departments and occupied in 1932.

In the meantime the college has grown from a class of fifty-two students to an enrolment of nearly 500 with two modern college buildings and several separate completely equipped laboratories at Syracuse and a large school building housing fifty Ranger School students at Cranberry Lake. During these years the college has acquired approximately 20,000 acres of forest lands in various sections of the state while the teaching staff, including the Ranger School, has grown from two to forty-seven.

## GIFT OF THE GENERAL EDUCATION BOARD TO THE MEMORIAL HOSPITAL, NEW YORK CITY

THE General Education Board, founded by John D. Rockefeller, has appropriated the sum of three million dollars to the Memorial Hospital for the Treatment of Cancer and Allied Diseases. With this sum there will be erected a twelve-story hospital building adjacent to the Rockefeller Institute for Medical Research, the New York Hospital and the Cornell University Medical College. The property on which the new hospital will be built is bounded by York and First Avenues and by Sixty-seventh and Sixty-eighth Streets. It is expected that ground for the project will be broken next autumn and that the building will be completed within a year.

Harry Pelham Robbins, president of the hospital, in his statement announcing the gift said:

> This magnificent gift is a significant expression of the vision and generous spirit of the General Education Board and John D. Rockefeller, Jr.
>
> It will create in North America for the first time a modern cancer institute even more broadly organized than those already existing in Rome, Milan and Buenos Aires. The scope of the project stirs the imagination.

Title to the property on which the hospital will be built is held by the Rockefeller Institute for Medical Research, which it is said will transfer it to the hospital. The site, comprising three acres and valued in 1934 at $900,000, was assembled, parcel by parcel, several years ago by Mr. Rockefeller, Jr., who intended to turn it over to the Memorial Hospital as soon as the institution could raise the funds for a building. The depression made it impossible for the Memorial Hospital, with a deficit of $50,000, to do this. In December, 1934, Mr. Rockefeller, Jr., gave the property to the institute.

The main building will house the service, administrative, laboratory, out-patient, ward and private patient facilities. There will be a nurses' home and, at some future time, a unit to handle advanced cases. Garden areas will be placed in the center of the block.

The present institution has only 110 beds, yet it accepted 3,200 patients for treatment last year and there are now more than 11,000 active cases under the care of the hospital. There is a daily average of 325 patients coming to the hospital and its nine clinics and x-ray and radium departments. Nearly 96,000 out-patient visits were made last year. About one third of the work of the hospital is free.

Memorial Hospital was founded in 1884 by Mr. and Mrs. John Jacob Astor and Elizabeth Hamilton Cullum.

## RECENT DEATHS AND MEMORIALS

DR. KARL PEARSON, emeritus professor of eugenics and formerly director of the Francis Galton Laboratory for National Eugenics at the University of London, died on April 27. He was seventy-nine years old.

PROFESSOR IRVING ALLSTON PALMER, head of the department of metallurgy of the Colorado School of Mines at Golden, died on April 29. He was seventy years old.

DR. GEORGE ELLSWORTH DAWSON, director of the psychological laboratory, Public Schools, Springfield, Massachusetts, died on April 21 at the age of seventy-four years.

WILLIAM B. VARNUM, who recently resigned as

astronomer at the Dudley Observatory, Albany, N. Y., died on April 27, at the age of sixty-seven years.

A BILL has been offered by Edwin Miller in the New York Senate that would authorize the state to add the home of the late Dr. Charles Steinmetz, of the General Electric Company, containing his workshop and experimental laboratory, to its present park system.

A STATUE erected in Danielsville by the state of Georgia in honor of Dr. Crawford W. Long, as the first physician to use ether anesthesia, was unveiled on March 30. The legislature authorized the erection of the memorial at or near Dr. Long's birthplace. Mrs. O. A. Harper, daughter of Dr. Long, and E. C. Long, Jr., assisted in the unveiling. Speakers included Governor Eugene Talmadge, Dr. Lamartine G. Hardman, Commerce, former governor; Dr. James E. Paullin, Atlanta, president of the state medical association, and Dr. Hugh H. Young, Baltimore.

THE Russian Government has decided to erect a monument to Pavlov in Leningrad and to name an institute after him, as well as to publish his works in four languages. His brain will be kept in the Moscow Institute for Cerebral Research. His widow is to receive a monthly pension of 1,000 roubles. A new asteroid discovered by the Simeiz Observatory in the Crimea has been named "Pavlodia."

# SCIENTIFIC NOTES AND NEWS

AT the annual meeting of the National Academy of Sciences held in Washington from April 27 to 29 the Agassiz Medal for Oceanography was presented to Dr. T. Wayland Vaughan, director of the Scripps Institution and professor of oceanography, the University of California. The public welfare medal was presented to Dr. F. F. Russell, lecturer on preventive medicine and hygiene at the Harvard Medical School, distinguished for his work as director of the International Health Division of the Rockefeller Foundation. The Agassiz Medal was presented by Dr. Henry B. Bigelow, of Harvard University, director of the Oceanographic Institute at Woods Hole, Mass., and the public welfare medal by Dr. Max Mason, recently president of the Rockefeller Foundation.

MEMBERS of the National Academy of Sciences have been elected as follows: Dr. Leo Hendrik Baekeland, honorary professor of chemical engineering, Columbia University; Dr. Eliot Blackwelder, professor of geology and head of the department, Stanford University; Dr. Ira Sprague Bowen, professor of physics, California Institute of Technology; Dr. Wallace Hume Carothers, research chemist, E. I. du Pont de Nemours, Wilmington, Del.; Dr. Alexander Forbes, associate professor of physiology, Harvard Medical School; Dr. William Francis Giauque, associate professor of chemistry, University of California; Dr. Clark Leonard Hull, professor of psychology, Yale University; Dr. Edwin Oakes Jordan, professor of bacteriology and chairman of the department, University of Chicago; Dr. Alfred Vincent Kidder, chairman of the division of historical research of the Carnegie Institution; Dr. Warren Harmon Lewis, professor of physiological anatomy, the Johns Hopkins University, and research associate of the Carnegie Institution; Dr. Robert Sanderson Mulliken, professor of physics, the University of Chicago; Dr. William Cumming Rose, professor of physiological chemistry, University of Illinois; Dr. Edmund Ware Sinnott, professor of botany, Columbia University; Dr. Joseph Leonard Walsh, associate professor of mathematics, Harvard University, and Dr. Orville Wright, director of the Wright Aeronautical Laboratory at Dayton, Ohio.

DR. EDWIN GRANT CONKLIN, who in 1933 became professor emeritus of zoology at Princeton University, was at the recent meeting of the American Philosophical Society reelected as one of the vice-presidents and was made executive vice-president, a new office. Mrs. Caroline French Skinker, who for the past twelve years has been executive secretary, will retire on June 30. A minute was adopted expressing appreciation of her services.

EDMUND NORRIS GATHERCOAL, professor of pharmacognosy of the School of Pharmacy of the University of Illinois, Chicago, has been awarded the Remington Honor Medal for 1936 of the New York Branch of the American Pharmaceutical Association "in recognition of his service to pharmacy as chairman of the Revision Committee of the National Formulary VI, his work in promoting higher standards for pharmaceutical products, his efforts to bring about the standardization of color nomenclature, his exhaustive study of prescription ingredients, his research in pharmacognosy and his record of many years of faithful service as a teacher."

THE Trudeau Medal of the National Tuberculosis Association has been awarded to Dr. Edward W. Archibald, professor of surgery at McGill University and consulting surgeon at the Royal Victoria Hospital.

IN recognition of her forty years' service to New York City Dr. Anna W. Williams, formerly assistant director of the research laboratories of the New York City Department of Health, received on April 27 a testimonial scroll presented by the Women's Medical

Society of New York State. The presentation was made by Dr. S. Josephine Baker, president of the National Women's Medical Association, at the annual dinner of the society at the Hotel Pierre.

THE friends and students of the roentgenologist, Dr. Antoine Louis Gustave Beclère, Paris, presented to him on March 17, his eightieth birthday, a medal and a book containing a summary of his contributions to his specialty.

THOMAS ULVAN TAYLOR, for thirty years dean of the College of Engineering of the University of Texas, a member of the university staff since 1888, who has now reached the age of seventy-eight years, will retire at the end of the academic year with the title of dean emeritus. He will continue part-time teaching. Dr. Taylor was the guest of honor at a banquet given by students, alumni and faculty on April 30.

DR. ESMOND R. LONG, director of the Henry Phipps Institute of the University of Pennsylvania, was elected president of the National Tuberculosis Association, at the New Orleans meeting, succeeding Dr. James J. Waring, of Denver. Dr. Hugh S. Cumming, Surgeon-General of the United States, retired, was elected an honorary member.

AT a meeting of the American Association of Pathologists and Bacteriologists held in Boston on April 9 the following officers were elected: *President,* Dr. N. C. Foote; *Vice-president,* Dr. Earl B. McKinley; *Treasurer,* Dr. F. B. Mallory; *Secretary,* Dr. H. T. Karsner; *Incoming Member of the Council,* Dr. S. Bayne-Jones; *Assistant Treasurer,* Dr. F. Parker, Jr., and *Assistant Secretary,* Dr. A. R. Moritz. The next meeting of the association will be held at Northwestern University Medical School, Chicago, on March 25 and 26, 1937. The topic for discussion at that meeting will be "The Genesis of Tumors."

AT the meeting of the American Society for Experimental Pathology held in Washington recently, the following officers were elected: *President,* Alphonse R. Dochez, Presbyterian Hospital, New York; *Vice-president,* C. Phillip Miller, University of Chicago; *Secretary-treasurer,* Shields Warren, Palmer Memorial Hospital, Boston; *Councilors,* Morton McCutcheon, University of Pennsylvania Medical School; Ernest W. Goodpasture, Vanderbilt University Medical School. The next meeting of the society will be held at Memphis, Tenn., from April 21 to 24, 1937.

THE Cornell University Chapter of Sigma Xi has elected seventy-one new members. Of these seven are faculty members, two are resident doctors, fifty-two are graduate students, and two are alumni members. Officers elected for the coming year are: *President,* B. F. Kingsbury, professor of histology and embryology; *Vice-president,* K. M. Wiegand, professor of botany; *Secretary,* L. F. Randolph, research associate in cytology; *Treasurer,* A. J. Heinicke, professor of pomology. Among those elected to membership are: *Alumni Members,* Professor Charles Joseph Ling and Professor Lucy Porter Sutton; *Faculty Members,* Professor P. N. Coryllos, Professor Jacob Furth, Professor Edwin S. Harrison, Dr. Daniel C. Lewis, Jr., Professor True McLean, Dr. Edward W. Saunders and Professor John N. Spaeth.

THE Sigma Xi Club of the University of Utah held its regular quarterly luncheon and business meeting for the election of officers on April 17. Dr. Thomas J. Parmley, vice-president during the past year, was elected president for the ensuing year. Dr. Charles Blumenfeld, associate professor of anatomy, was elected vice-president. Dr. Margaret Schell, secretary and treasurer for the past several years, was reelected. The retiring president is Dr. F. F. Hintze, associate professor of geology and paleontology. The club held its quarterly dinner meeting on May 2, when Mrs. H. L. Marshall presented a thesis on "The Present Status of the Recapitulation Theory."

THE Smith Chapter of the Society of the Sigma Xi held its annual initiation exercises on April 20. Nine members of the faculty and seventeen students were initiated. Dr. Florence R. Sabin, of the Rockefeller Institute for Medical Research, was elected an alumna member. Professor William Henry Weston, Harvard University, spoke on "The Significance of Recent Investigations of the Sexuality of the Lower Fungi." Newly elected officers of the chapter are: Dr. Neal H. McCoy, *president;* Dr. Jessie Y. Cann, *vice-president;* Dr. Geo. Olds Cooper, *secretary,* and Dr. Elizabeth S. Hobbs, *treasurer.*

WILLIAM D. HARKINS, formerly Carl William Eisendrath professor of physical chemistry at the University of Chicago, has been made Andrew MacLeish distinguished service professor, with duties restricted to research and the supervision of seminars. His researches will be in the fields of nuclear chemistry, surface chemistry and electrical discharges. Dr. Henry W. Newson, from the Radiation Laboratory of the University of California, has been appointed research instructor and Robert J. Moon full-time research assistant in nuclear chemistry. Dr. Robert J. Myers, of the Johns Hopkins University, has become research associate in surface chemistry. A large amount of apparatus is under construction for use in both nuclear and surface chemistry, and a part of the old power house of the university has been taken over for nuclear research.

DR. J. G. FITZGERALD, dean of the Faculty of Medi-

cine and director of the School of Hygiene and of the Connaught Laboratories of the University of Toronto, has been invited by the Rockefeller Foundation to make a study of the methods at present employed in the teaching of preventive medicine to undergraduates in medical schools. It is anticipated that the study will occupy a period of one year from September 15. Dr. Charles Edward Smith, of the Stanford University Medical School, San Francisco, will assist in the undertaking. University medical schools in the United States and Canada, the British Isles and in European countries will be visited in the course of the survey. Dr. FitzGerald will resign as dean of the Faculty of Medicine of the University of Toronto on June 30. He will be given leave of absence by the governors of the university for the necessary period and will, it is expected, return to the university in September, 1937, as director of the School of Hygiene and of the Connaught Laboratories.

DR. NOLAN D. C. LEWIS, director of the laboratories of St. Elizabeth's Hospital, Washington, has been appointed professor of neurology in the Columbia University College of Physicians and Surgeons, and associate director of the Neurological Institute of the Columbia-Presbyterian Medical Center.

PROFESSOR BRADLEY STOUGHTON, since 1923 head of the department of mechanical engineering at Lehigh University, has been appointed dean of the newly organized College of Engineering.

PROFESSOR JAN SCHILT, of the department of astronomy at Columbia University, has been named director of the Rutherford Observatory.

DR. FRANK FREMONT-SMITH, until recently assistant professor of neuropathology at the Harvard Medical School and associate psychiatrist at the Massachusetts General Hospital, has become a member of the staff of the Josiah Macy, Jr., Foundation. He will be in charge of the medical division to which he will give full time.

DR. CLYDE FISHER, director of the Hayden Planetarium of the American Museum of Natural History, who will be a member of the solar eclipse expedition sent by Harvard College Observatory and the Massachusetts Institute of Technology, plans to visit after the eclipse the meteor craters formed in Siberia in 1908.

AMONG the visiting professors who recently spent the winter term at the School of Tropical Medicine, Puerto Rico, was Dr. William Thornwall Davis, of the School of Medicine of the George Washington University. Dr. Davis gave two lectures, one before the members of the Insular Medical Association, gathered at their annual meeting, on "Ophthalmology in the Tropics," and the other at the regular weekly session of the school on "The Orthoptic Treatment of Squint." During his stay in Puerto Rico Dr. Davis was the guest of Governor Blanton Winship.

THE twelfth annual faculty research lecture of the University of California at Los Angeles was given on May 6 by Dr. Vern O. Knudsen, professor of physics. His subject was "Modern Acoustics and Culture." The selection of faculty research lecturer is made by members of the faculty who have been accorded the honor in former years.

JOHN H. WOLFEND, lecturer in physical chemistry at the University of Oxford, has been appointed Frank B. Weeks lecturer at Wesleyan University.

DR. PAUL B. SEARS, head of the department of botany at the University of Oklahoma, gave a lecture on "Postglacial Climate and Vegetation" under the auspices of the Kansas State College Chapter of Sigma Xi at Manhattan on April 24. He also spoke before a group of research workers on "The Ecological Approach to Conservation."

DR. R. E. ROSE, director of the Technical Laboratory of the E. I. du Pont de Nemours and Company, Inc., on April 23 addressed the Pittsburgh Section of the American Chemical Society and members of Phi Lambda Upsilon in Pittsburgh on "Recent Advances in the Field of Dyestuffs." Dr. Rose also addressed the Lehigh Valley Section of the American Chemical Society in Reading, Pa., on April 24, when he spoke on "The Last Ten Years in Dyestuff Manufacture."

PROFESSOR G. A. BAITSELL, of Yale University, spoke on "The Molecular Pattern of Living Matter" at the Biological Seminar at Brown University on April 17.

DR. LEON ASHER, professor of physiology at the University of Berne, will deliver a lecture on "Integration by Internal Secretions" at Washington University School of Medicine, St. Louis, on May 11.

ON the evening before the meeting of the executive committee of the American Association for the Advancement of Science at Lancaster, Pa., on April 18, a dinner was given to the members of the committee by the Lancaster Branch, which has now reached its limit of one thousand members. Remarks were made by Dr. Otis W. Caldwell, general secretary; Dr. Henry B. Ward, permanent secretary, and Dr. J. McKeen Cattell, chairman of the executive committee. An address was then given by Dr. Edwin G. Conklin, president of the association.

THE American Society of Mammalogists will hold its eighteenth annual meeting at the Academy of Natural Sciences, Philadelphia, from May 12 to 16.

A CHAPTER of Sigma Xi, national honor society in science, was installed at Carleton College, Northfield, Minn., on April 22, with Dr. William F. Durand, of Stanford University, national president, and Dr. Ross A. Gortner, of the University of Minnesota, as installing officers. Two chapters of Sigma Xi exist in Minnesota, at the University of Minnesota and at the Mayo Foundation in Rochester. Carleton is the first liberal arts college in the West to be granted a chapter. Nineteen members of the Carleton faculty are members. Five of these are graduates of the college who were elected into the society while doing graduate work at other schools.

THE first International Conference on Fever Therapy is to be held at Columbia University, New York City, from September 29 to October 3. The subjects to be discussed will include physiologic and pathologic changes as well as the treatment of gonorrhea, gonorrheal and non-specific arthritis, syphilis, neurologic conditions such as multiple sclerosis, chorea, paresis, tabes, skin diseases, etc. The meeting will be held under the chairmanship of Baron Henri de Rothschild, of Paris, France. The French committee, of which Professor d'Arsonval is honorary president, is under the chairmanship of Professor Abrami. Other members of this committee include Professors Alajouanine, Binet, Claude, Janet, Lardennois, Laubry and Levaditi and the general secretaries of the committee, Drs. Halphen and Auclair. The American committee consists of Drs. Desjardins, Bierman, Hartman, Hinsie, Neymann, Simpson and Warren. National European committees are being formed under the direction of Professors Maranon, of Spain; Frugoni, of Italy; Volhardt, of Germany; Wagner-Jauregg and Eppinger, of Austria; Michaux, of Switzerland; Bessemans, of Belgium, and Danielopolu, of Roumania. Abstracts of the papers to be read are to be published in the volume of the transactions in English, German and French. Information regarding this conference may be secured from the General Secretary, Dr. William Bierman, 471 Park Avenue, New York City.

TWENTY students received certificates from the New York Botanical Garden on April 20 in recognition of their completion of two years of work in the course for professional gardeners. This is the third and largest graduating class in the history of the course, which was established in 1932 in order to give the gardeners employed at the Botanical Garden a background of the sciences underlying their work. Gardeners from estates around New York have also been permitted to take the work, and this year several florists, nurserymen and landscape gardeners have also been among the students.

THE American Institute of Physics has changed its address to 175 Fifth Avenue, New York City. The founder societies of the institute, which include the American Association of Physics Teachers, the Society of Rheology, the Acoustical Society of America, the Optical Society of America and the American Physical Society, will hold regular meetings jointly in New York from October 28 to 31, to signalize the fifth year of their cooperative association. In addition to the customary technical sessions there will be a Symposium on Industrial Physics and an anniversary dinner.

THE League of Nations will award the Darling prize of 1,000 Swiss francs this year for the best work in the pathology, etiology and prophylaxis of malaria. Works which have been published within the last five years, as well as unpublished works, may be submitted.

AN anonymous donor has given £10,000 for the establishment of an Institute of Experimental Psychology at Oxford University. A decree has been proposed allocating to the Institute £500 and £150 a year for five years from the fund of the Rockefeller Foundation for research in social sciences.

# DISCUSSION

## THE DELPORTE PLANET 1936CA

ON February 12, 1936, the astronomer, Delporte, at the Belgian National Observatory at Uccle, Belgium, discovered a tiny object, which was later identified as a planet. When the orbit of the body was calculated, it was found that it had passed very close to the Earth. In the press, many persons have speculated as to what might have happened if the object had struck the Earth. In most cases, the picture painted has been rather pessimistic.

In the accompanying figure is shown the path of the object as well as the paths of Mercury, Venus, the Earth and Mars. It should be noted that the planes of the paths are not the same but are inclined to each other at small angles. Consequently, what appear to be intersections on the diagram are only close approaches in reality. For instance, when the Earth passed the point marked $E_1$ on the diagram about February 7, the small planet was very near this point, in fact only about 1,200,000 miles away. About January 19, 1936, the object passed close to the path of Venus at the point marked $v_2$; at that time Venus was in another part of its path, namely at $V_2$. Before that, it had passed its point of closest approach to Mercury's path at a distance of about 13 million miles.

Ignoring for the moment the changes in the path

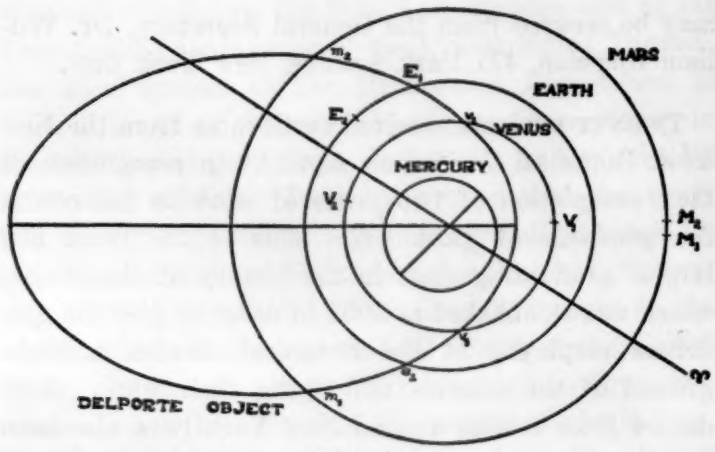


FIG. 1

due to the gravitational attractions of the major planets, let us consider the motion of the object under the gravitational attraction of the Sun alone. It would have passed the point $m_2$ near the path of Mars about March 17, while Mars was actually at the position marked $M_2$. It would again be near the path of Mars at $m_1$ about January 25, 1938, and again Mars will be at a distant point, $M_1$. It would reach $e_2$ near the Earth's path about March 5, 1938, at which time the Earth will be at the position marked $E_2$ on the diagram. It would reach the point $v_1$ near Venus's orbit about March 25, 1938, when Venus will be at $V_1$. As it approaches $v_2$ again, it will likely be subject to large perturbations by Venus.

Some persons have viewed with alarm the close approach of this Delporte planet, telling sad stories of what might have happened if the planet had struck the Earth. Unquestionably the results of such a collision would be unfortunate, but one finds from calculations based on reasonable hypotheses that, of all the bodies coming within a million miles of the Earth, only sixteen in a million will strike the Earth. Of those striking the Earth, about 73 per cent. will fall in oceans or seas and 23 per cent. will fall in sparsely inhabited territory. Thus, of bodies coming within a million miles of the Earth, less than one in a million will strike cultivated sections of the Earth.

It is encouraging also to note that the Delporte planet, like most objects traveling in periodic paths in this part of the solar system, is moving in the same direction about the Sun as the Earth. In the event of a collision, it would be a rear-end one rather than a head-on one. For example, when the Delporte planet was nearest the Earth, it was moving with a speed of about 23 miles per second while the Earth was traveling in approximately the same direction with a speed of 19 miles a second. The relative speed of the two was only about 4 miles a second instead of approximately 40 miles a second as in the case of a head-on collision.

Though it is impossible at the present to predict precisely where the object is going in the distant future, one need not worry too much about one's safety on the Earth.

C. H. SMILEY
WARD CROWLEY

BROWN UNIVERSITY

## THE DENSITY OF PURIFIED NEVADA HOT SPRING AND SURFACE WATER

THANKS to the kindness of S. C. Dinsmore, state food and drug commissioner, the University of Nevada, in supplying me with samples of water from several Nevada hot springs, from melting snow at an elevation of 6,000 feet in Nevada near Reno and from the earth's surface near one of the hot springs, it has been possible to compare the density of these waters with the water of Lake Michigan. The Nevada surface water and the water from three different hot springs all have the same density (after purification, of course) within the limits of experimental error[1] and are lighter than Lake Michigan water to the extent of $2.8 \pm 0.6$ p.p.m. The density of the water from melting snow appears to be intermediate between that of the hot springs and of Lake Michigan, but the supply unfortunately gave out before the density had been exactly determined.

At the suggestion of Professor Urey the Nevada water was analyzed in order to find out whether the deficiency in density was due to the hydrogen or to the oxygen. A sample of Nevada water was electrolyzed and the cell oxygen combined with tank hydrogen; a sample of Lake Michigan water was treated in exactly the same way, the resulting water in the former electrolysis being 2.2 p.p.m. lighter than the water resulting from the latter electrolysis. Thus the difference in density between Nevada and Lake Michigan water is seen to be due primarily to the oxygen in the two waters and not to the hydrogen. One wonders if this difference is due to the isotopic exchanges theoretically treated by Urey and Greiff;[2] apparently the juvenile nature of the water affects its density in no way.

The author gratefully acknowledges the suggestions given by Dr. Charles H. Behre, Jr., chairman of the department of geology and geography of Northwestern University, regarding sources of juvenile water and the problem in general.

MALCOLM DOLE

NORTHWESTERN UNIVERSITY

## ORIENTATION OF A DISK SETTLING IN A VISCOUS FLUID

To the best knowledge of the writers, all theory and experiments dealing with the position of stability of a disk settling through a viscous liquid under the force of gravity have indicated that the disk will orient itself so that its major plane is horizontal.

[1] For experimental details see M. Dole, *Jour. Chem. Phys.*, 2: 337, 1934; *Jour. Am. Chem. Soc.*, in press.

[2] H. C. Urey and Lotti J. Greiff, *Jour. Am. Chem. Soc.*, 57: 321, 1935.

Recent experiments by the writers indicate that the orientation is a function of the viscosity of the liquid. For example, the horizontal position is the position of stability for glass disks settling in water or other media of low viscosity. In a medium of high viscosity, the disks will orient themselves vertically.

A very simple and beautiful demonstration of this change in the position of stability can be made by filling a large jar two-thirds full of Karo syrup, and then filling the rest of the jar with water. When these are imperfectly mixed, the viscosity of the liquid increases toward the bottom of the jar. If now a cover-glass is dropped into the jar, it will orient itself horizontally during the first part of its fall. As it settles into the liquid of higher viscosity, this is no longer the position of stability, and it is seen to turn on edge and dive toward the bottom.

The orientation is also a function of the velocity of fall. The higher the specific gravity of the disk the deeper it will sink in the jar before turning from the horizontal to the vertical position, thus the more viscous will be the liquid at the point of turn.

This dependence of orientation on viscosity is of interest to geologists in connection with crystal subsidence in a magma reservoir. It may also explain hitherto unsolved problems in the orientation of fragments in sedimentary rocks.

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## THE EXPERIMENTAL MARKING OF HALIBUT

MARKING experiments with live fish in connection with the life history studies of the important species are being carried out by many governments that have commercial fishing interests. These experiments yield indispensable information on the migration of the fish, their rate of growth and the intensity of the fishery. The type of mark that can be attached to the fish varies with the species, but all investigators are agreed that the ideal mark must be one that can not be lost from the fish or overlooked by the fisherman who catches the fish and returns it. The greatest possible accuracy is desirable in determining the mortality rates and migrations from the returns.

The International Fisheries Commission has been charged by treaty to investigate and regulate the Pacific halibut fishery. Its staff has used a monel metal strap tag attached to the opercle of the eyed side of the fish. In the undoubtedly successful and extensive marking experiments it has conducted some question has remained as to whether some tags were not lost from the living fish or overlooked by the fishermen. New marks to be affixed to the halibut in addition to the present monel tag have been devised. It is believed they may prove of general application to investigations of this type. The marks experimented with are of two types.

First, a tattoo mark consisting of the initials I. F. C. and a number was made on the cheek or nape of the neck on the white side. The number was added so that in case the strap tag should be lost the date and locality of marking could still be traced. The tattooing was done with Higgins American Waterproof India ink and a hypodermic needle attached to a small metal hypodermic syringe. With each puncture of the needle a little ink was pressed in and sufficient punctures were made to form the letters and number indicated above. The whole procedure took less than one minute to perform.

Second, tags were placed in the body cavity of the halibut. These were manufactured from No. 60 orange-red celluloid and stamped with a number and legend for recovery. They were 64 mm long by 22 mm wide at one end, tapering down to 18 mm at the other. This tapering was made to facilitate the insertion of the tag through an incision made on the posterior part of the abdomen on the eyed side, the incision being just large enough to admit the small end of the tag. The tag when inserted into the body cavity is lodged among the intestinal caecae, and is recovered when the fish is being eviscerated. The chances for its recovery have been greatly improved since the livers of the fish are now carefully removed from among the viscera and are sold for medicinal purposes.

In May and June, 1935, 596 halibut were tagged on the Goose Island Grounds situated in Queen Charlotte Sound, British Columbia. Of these 343 were tattooed and 253 were marked with the celluloid body cavity tags. Up to September 6, 1935, when this general area was closed to commercial fishing, there have been 28 or about 8.2 per cent. of the tattooed fish returned and 12 or 4.7 per cent. of those carrying the celluloid tags. No tattooed fish or those carrying celluloid tags were recovered without a metal tag still firmly attached.

Of the 28 returns with tattoo marks it was found that this mark was noticed before the metal tag in 24 cases, and in two cases it was noticed on the fish in the water before it was landed. In every case the tattoo mark was almost as clear when recovered as when it was put on. Microscopic examination reveals that the carbon particles of the ink have lodged in the scale pockets, epidermis and underlying muscle tissue, and the surface particles of ink have been covered by a thin layer of transparent epidermal tissue. This epidermal regeneration is complete in every case after

the fish have been at liberty for 30 days or more. The longest period of liberty to date is 99 days. It is believed, then, that this mark should be permanent unless the carbon particles are later absorbed.

In two out of the twelve fish recovered bearing the body cavity tags the celluloid tag was noticed before the metal tag and in one case the celluloid tag was completely overlooked. The incision was completely healed in every case after the fish had been at liberty for 70 to 80 days. The longest period of time that any of these fish were out is 89 days.

It would be premature as yet to give a definite estimate of the value or the permanency of these marks or their superiority over the strap tag. If the tattoo marks do not fade over a greater period of time than is here recorded, this type of mark would be almost ideal for the halibut; and if it is used in addition to the regular strap tag, as was done in the present experiment, it should aid in the recognition of very nearly all the tagged fish that might be recovered. Furthermore, it would give a clue to whether and in what numbers strap tags have been overlooked or lost in past experiments. This the body cavity tag may also do, though a somewhat higher mortality from the effects of this mark is indicated.

JOHN LAURENCE KASK
INTERNATIONAL FISHERIES COMMISSION
SEATTLE, WASH.

## RUBBER CONTENT OF GOLDENROD LEAVES AFFECTED BY LIGHT

THE leaves of the many wild species of goldenrod (Solidago) contain rubber, frequently to the extent of 3 to 6 per cent.;[1] and as much as 13 per cent. has been obtained from cultivated plants in experiments initiated by the late Thomas A. Edison at Fort Myers, Florida. The rubber content increases with the maturity of the leaves, but as soon as the leaves die they lose most of their rubber, whether remaining on the plants or lying on the ground. With a view to learning whether light is a factor in the rapid decline of rubber in the dead leaves, samples were exposed to sunlight in Cellophane envelopes of different colors for various periods of time. The use of Cellophane was suggested by Flint's work on light-sensitive lettuce seed.[2]

Three species of Solidago were included in the test, *Solidago leavenworthii, S. altissima* and *S. fistulosa,* and the leaf samples were exposed in red, blue, green and clear envelopes. Check samples in black paper envelopes were exposed with the colored envelopes. The leaves exposed in the red, green and blue envelopes showed notable losses in rubber content, and those in the clear envelopes lost most of their rubber, while material from the black envelopes showed no loss, but often a gain. Samples of *Solidago leavenworthii,* which analyzed 4.39 per cent. of rubber at the beginning of the experiment, gave the following percentages after one week of exposure in the different envelopes: clear 3.38, red 3.63, green 3.75, blue 3.89 and black 4.72. The corresponding percentages after two weeks of exposure were 1.98, 2.69, 2.74, 3.28, 6.27; after four weeks 2.00, 2.69, 2.94, 3.28, 6.00, and after six weeks 1.81, 2.25, 1.97, 2.65, 5.98. Results with the other species were consistent, and the data leave no doubt that light is a factor in reducing the rubber content of goldenrod leaves after harvesting.

Analyses were made later of leaf material from the envelopes that had been exposed and then stored for several weeks in the laboratory, and it was found that the rubber content of the leaves in the black envelopes had not declined but had increased, while material from the colored bags showed a further decline in rubber content. Thus the black-envelope sample of *S. leavenworthii,* that analyzed 6.27 per cent. after two weeks' exposure in the field, contained 7.34 per cent. after six weeks in the laboratory, and likewise the samples exposed for four and six weeks increased after two weeks in the laboratory, from 6.00 to 7.12 and from 5.98 to 6.70, respectively. These data were obtained from samples grown at Glenn Dale, Maryland, and were confirmed by samples from Savannah, Georgia, and Fort Myers, Florida, that had received similar treatment.

JOHN T. PRESLEY
U. S. BUREAU OF PLANT INDUSTRY

## THE YOUNGEST MEMBER ELECTED TO THE NATIONAL ACADEMY OF SCIENCES

IN the minute on Carl Barus (1856–1935) published in SCIENCE for November 22, 1935, pp. 481–483, Professor Lindsay and I wrote that at the age of 36 Dr. Barus was elected "a member of the National Academy of Sciences in 1892—the youngest man [that is, in 1892] who had ever been so honored." This unchecked statement was taken from an autobiographical sketch. A friend has drawn attention to one of my own articles on Simon Newcomb (1835–1909) published in SCIENCE for December 22, 1916, p. 872, where I noted that Newcomb became a member on September 1, 1869, when 34 years of age. Professor J. McKeen Cattell has informed me that at a later date, namely 1899, Theodore W. Richards was elected a member at the age of 31. Has any member been elected who was younger than 31?

While referring to the National Academy may I point out the great need for a volume containing a

[1] Loren G. Polhamus, *Jour. of Agricultural Research,* Vol. 47, No. 3, Aug. 1, 1933, pp. 149–152.
[2] Lewis H. Flint, SCIENCE, Vol. 80, pp. 38–40, 1934.

complete list of those who have ever been members or foreign associates of the academy, together with exact dates of election. I have recently been astonished to find that it was necessary laboriously to delve into manuscript records before it could be learned that a certain distinguished scholar became a foreign associate in April, 1883. It is true that in the "Annual Report of the National Academy of Sciences" for 1930–31, one finds the following: (a) a complete list of living members, of members emeriti and of living foreign associates of the academy, with the *years* of election; (b) medallists of the academy, with the name of the medal and the year of the award; (c) a list of deceased members, with the year of election and the exact date of death; (d) a list of deceased foreign associates, without either the date of election or the date of death; (e) the exact dates of birth of living members of the academy. Now if all five of these lists were put in a single alphabet, with additional information, such as places and dates of birth, and of death if dead, *exact* dates of election and as full information regarding foreign associates as members, we should have a list which would be much more useful. Especially would this be true if it were kept up to date and published annually. For nearly twenty years the Academy of Sciences of the Institut de France has published such an *Annuaire,* the one for 1935 being a duodecimo volume of 407 pages covering the period 1795–1935. Another volume (281 pp.) covers the period 1666–1793. What better model could our National Academy follow in getting out its own volume for the period 1863–1936?

RAYMOND CLARE ARCHIBALD
BROWN UNIVERSITY

# SCIENTIFIC BOOKS

## THE MORPHOLOGY OF ALGAE

*The Structure and Reproduction of the Algae.* By F. E. FRITSCH. Vol. 1, xvii + 791 pp. Cambridge University Press, England, and Macmillan Company, New York. 1935.

THE appearance of a major compendium in the morphology of one of the large plant groups is something of a scientific event; when well done, as in the present case, marked advances in knowledge of the group are sure to follow. But once has an adequate modern treatise on algal morphology been completed (F. Oltmanns's "Morphologie und Biologie der Algen," in two editions). The present work, in so far as the first volume of two projected is concerned, is more limited in scope in that ecological and physiological features receive no separate consideration, although a wealth of data on the environal requirements and food reserves of the various genera are included. With the benefits of the scientific advance of a very active decade and a much more detailed treatment, this work puts English-reading botanists at a great advantage. Should the work be completed in conformity it appears that the basis of reference for a generation will have been established. The title is really definitive, for with but a skeleton of classification the form and structure of these plants are discussed in detail. For the most part the approach is directed to the structures and organs characteristic of the family under consideration, their variation in the several genera and possible evolutionary trend. The information is so closely associated with the original sources by copious citation that a very detailed presentation results, since the author attempts to introduce all pertinent literature since 1890. This puts the text quite out of the introductory class, and invaluable as this work will be to the phycologist it will offer a rather complex picture to any one who approaches it without a little preliminary experience with algal literature. As a source book it will save much labor, but it is not designed to serve as a teaching text, even for advanced students.

The algal groups covered in the present volume include all except the Phaeophyceae and Rhodophyceae. The 75 pages of introductory discussion provides descriptions of these groups and tables contrasting various critical structures. However, the main introductory sections deal with the chief fundamental parts such as chromatophores, nuclei, the flagella and the wall, or more inclusive features as filamentous and tissue organization, growth and reproduction, epiphytism and parasitism in such fashion as to give a very good picture of the algae indeed. Especially timely in view of the numerous equivalent classes of algae is the emphasis on parallelisms in evolution among them. In the body of the book the treatment is much more thorough than that accorded by Oltmanns, particularly in the flagellate types. There is little to be said about the systematic frame adopted. It appears to be well and carefully adjusted to recent researches, and the eleven classes offered have wide acceptance. The author exempts Chloromonadineae and Euglenineae from the word-form standard for classes in the algae, but his reason (lack of members with complete "algal organization") seems hardly to offset the disadvantage of lack of uniformity, since he accepts Cryptophyceae and Dinophyceae, which are so largely flagellate in the vegetative state. Xanthophyceae is used to include the familiar Heterokontae, which brings that group into line; the charophytes are discussed as an order in the Chlorophyceae, which some will feel to be hardly adequate recognition of

their isolated and specialized character. There are some details of this classification, however, such as that given for the Siphonales, which may need rather thoughtful inspection. The book is clearly and abundantly illustrated, with 245 mostly full-page groups of well-chosen figures, generally from original sources, largely not previously met in a text-book, and fairly well reproduced. A few half-tones (as figs. 124E, 127A) are rather vague and there is considerable lack of uniformity in the lettering of the figures (comparing figs. 11, 109, 235 with 113, 158, 166). The type is rather small, and that used for paragraphs dealing with subsidiary topics not very different from that of the body of the text. However, the appearance of the book is on the whole very good.

WM. RANDOLPH TAYLOR
UNIVERSITY OF MICHIGAN

## ANIMAL LIFE IN THE HOLY LAND

*Animal Life in Palestine.* By F. S. BODENHEIMER. 506 pp. L. Mayer, Jerusalem, 1935.

IN the initial chapters the zoogeographical position and geological history of the fauna are discussed and the climate and weather are presented in the light of animal response. This section includes many diagrams showing relations to weather, climate and the seasons. The types of vegetation are described; some good grassland and small areas of cedar of Lebanon forest still remain. A series of chapters on the various animal groups begins with the mammals, of which 95 species are enumerated with notes as to habitats. The following have been extirpated from the area or are entirely extinct: the lion, a leopard, the Syrian bear, roe deer, fallow deer, the Arabian oryx, Barbary sheep and two wild asses. Here in 10,000 square miles, after 3,500 years of occupation by civilization, nine species have disappeared, as compared with eleven in an equal area in central Illinois, which has been occupied by civilization one hundred years.

A discussion of the birds, following the general plan for the mammals, also includes data as to migration, with maps. The ostrich has been extirpated and, with the completion of certain contemplated swamp drainage, various water birds will disappear. The chapter on reptiles and amphibia contains diagrams and tables indicating temperature and activity; the species are listed and their habits stated. Chapter four, which deals with the insects, contains 160 pages; it is subdivided into sections, each concerned with an order and accompanied by diagrams and tables illustrating activity and response to conditions. Chapter five is devoted to the lower arthropods and remaining terrestrial invertebrates; parasites are treated in the same manner as the other groups.

Both fresh and salt water communities and fauna are discussed; plankton, fishes and mollusks receive attention.

The book is a good and thoroughly modern treatment, in spite of the fact that it is arranged according to taxonomic groups rather than communities, a necessary result of the impossibility of conducting a complete community study of such an area.

V. E. SHELFORD

## ELECTROCHEMISTRY

*Principles of Experimental and Theoretical Electrochemistry.* By MALCOLM DOLE. McGraw-Hill Book Company, New York and London, 1935. 549 pages. $5.00.

WITHIN recent years the science of electrochemistry has passed from a subject whose theories were comparatively easily understood to one which requires an extended knowledge of theoretical physics for its comprehension. This is due principally to the development of the important theory of the effects of Coulomb forces upon the distribution and properties of the ions both in the absence and presence of external electrical fields. Simultaneously with this important advance the experimental part of the subject has been greatly refined in both method and technique. Because of these rapidly developing complications, the writing of a satisfactory treatment of the subject is no easy task.

In spite of the difficulties, Dr. Dole has succeeded in writing an excellent text on the strictly scientific part of electrochemistry which should serve to give students of physical chemistry a comprehensive introduction to the field. The subject-matter is up to date and has been derived from the best of the recent literature. Too great emphasis on the profounder aspects of the theory and the details of the experimental material have been avoided and the result is a well-balanced treatment of the subject.

The material is arranged in the following order: "Conductance," "Transference Number," "Dielectric Constant and Electric Moment," "Concentration Cells with and without Liquid Junction," "Homogeneous Ionic Equilibria," "Membrane Potentials," "Oxidation and Reduction Cells," "Potentiometric Analysis," "Glass Electrode," "Electrokinetic and Electrocapillary Phenomena," "Irreversible Electrode Phenomena" and a final chapter on "Quantum Mechanics and Electrochemistry." In each chapter the author has described in a clear manner the method of measurement and the results and has then pointed out the theoretical interpretation and the limitations of the theory.

The book is well written and may be highly recommended for the concise and exact method of presentation.

HERBERT S. HARNED
YALE UNIVERSITY

# THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

## MINUTES OF THE EXECUTIVE COMMITTEE

THE meeting was held on April 19, 1936, in Lancaster, Pa., with the following members present: Drs. Cattell (*chairman*), Caldwell, Conklin, Livingston, McKinley, Ward and Woods.

The minutes of the last meeting held in Saint Louis in December were reported as approved by mail and printed in SCIENCE.

The permanent secretary presented statements of current finances of the permanent secretary's and treasurer's offices, financial statement of the Saint Louis Exhibition, membership and circularization for information; these were discussed *in extenso*.

It was voted that for the fiscal year 1936–37 $2,000 be appropriated to the committee on grants for allotment in grants for research.

It was voted to adopt the following resolution drawn up by the treasurer:

All investments and reinvestments of either principal or accumulations of income of the trust and other funds of the Association shall be made by the treasurer, in accordance with the decisions of the finance committee, in the corporate name of the Association, in the manner and in the securities designated or specified in the instruments creating the several funds, or, in the absence of such designation or specification, in bonds of the United States or of the several States, or in bonds or notes secured by first mortgages on real estate, in investments legal for savings banks under the laws of Massachusetts or New York, or in other securities recommended by the financial adviser.

It was voted to adopt the following rule in connection with the treasurer's funds:

Unexpended balances of research funds or the apportioned income therefrom shall be retained in said funds and not credited to general reserve or to funds available for general expenses.

It was voted to transfer $5,000 from the treasurer's accumulated funds for general purposes to the permanent secretary's office for the purpose of increasing the organization work of the association.

It was voted that in future the income from accumulated funds for research shall be added to the research funds which may be appropriated annually.

It was voted that in future the income from accumulated funds for general purposes shall be paid annually to the permanent secretary to be added to the funds at the disposal of the council.

The general secretary presented a report on the financial arrangement with affiliated state academies. He was authorized to complete at an early date payments to academies of grants for research, set aside for 1935 and 1936.

It was voted that hereafter the research grants for each academy be sent directly to the proper officer in that academy, and that the academy distribute the grant to the person or persons chosen by the academy to receive the grant. It was further provided that each academy shall report promptly to the office of the permanent secretary the person or persons given a grant and the nature of the research to which the grant is assigned, and finally that a report upon the research done shall be submitted subsequently by the academy to the office of the permanent secretary.

After discussion the following motion was adopted:

The amount of the research grant to each affiliated academy for 1936–37 shall be the nearest $25 above the sum that would have been allowed if the plan had been continued of refunding fifty cents for each academy member who is also a member of the Association. The academy shall report to the office of the permanent secretary the number of members in good standing in both the academy and the Association.

The permanent secretary presented for information data on meetings to be held at Rochester, N. Y. (June 16 to 18) and at Ithaca on June 19 and 20, with participation in the Sigma Xi Semi-Centennial; Atlantic City (December 28, 1936, to January 2, 1937); Denver (June 21 to 26, 1937); and Indianapolis (December 27, 1937, to January 1, 1938).

The appointment of Dr. James Johnston Waring as local chairman for the Denver meeting was confirmed.

The appointment of Dr. Stanley Coulter as local chairman for the Indianapolis meeting was confirmed.

The executive committee voted to hold the summer meeting of 1938 in Ottawa, Canada, upon invitations from the government of the Dominion of Canada and from an extended series of scientific organizations and institutions in Canada.

Appointment of the following members to act as an executive committee for the subsection on dentistry was approved:

Professor Thomas J. Hill, secretary of the American Division of the International Association for Dental Research, Dental School, Western Reserve University, Cleveland, Ohio. *For the term 1936–39.*

Professor J. L. T. Appleton, Dental School, University of Pennsylvania, Philadelphia, Pa. Member of the Philadelphia Section to be in charge of the dental program at the Atlantic City meeting next December. *For the term 1936–38.*

Professor M. L. Ward, Dental School, University of Michigan, Ann Arbor, Michigan. *For the term 1936–37.*

The appointment of the following members to act as an executive committee for the subsection on pharmacy was approved:

Dr. John C. Krantz, Jr., *chairman;* University of Maryland School of Medicine, Baltimore, Md.

Dean R. A. Lyman, University of Nebraska, Lincoln, Nebr.

Dean Wortley F. Rudd, School of Pharmacy, Medical College of Virginia, Richmond, Va.

The president (Dr. E. C. Conklin) was authorized to represent the American Association at the meeting of the British Association for the Advancement of Science to be held at Blackpool, England, on September 9 to 16, 1936.

Dr. Oswald Veblen, Princeton University, was appointed the representative of the American Association at the International Congress of Mathematics to be held in Oslo, from July 13 to 18, 1936.

The chairman of the executive committee was appointed the representative of the American Association for the Harvard Tercentenary Celebration to be held from September 16 to 18, 1936.

Election of fellows on recommendations of the respective sections were as follows: Section on Psychology, 2; Section on Medical Sciences, 2; Section on Education, 1.

Dr. J. McKeen Cattell was appointed to serve for another term of seven years as trustee of the Institute of International Education representing the American Association.

Dr. O. W. Caldwell was appointed to succeed himself as the representative of the American Association on the council of the National Parks Association.

The chairman, Dr. Caldwell, and Dr. J. C. Merriam were appointed to serve as representatives of the American Association at the tenth anniversary meeting of the American Association for Adult Education.

The committee adjourned to meet in Rochester, N. Y., on Monday, June 15, at 2 P. M.

HENRY B. WARD,
*Permanent Secretary*

# SOCIETIES AND MEETINGS

## THE KANSAS ACADEMY OF SCIENCE

THE sixty-eighth annual meeting of the Kansas Academy of Science was held at the Kansas State Teachers College, Emporia, Kansas, on April 2, 3 and 4. A total of 306 persons, mostly from the colleges and secondary schools of the state, registered and the attendance at all sessions slightly exceeded that of former meetings.

The opening address was by Professor George A. Dean, head of the department of entomology, Kansas State College of Agriculture and Applied Science, Manhattan, on the subject, "The Practical Use of Insects for the Control of Insect Pests and Noxious Weeds." The academy members were invited to attend, with the students of the college, the showing of the sound film, "The Human Adventure," at the Granada Theater on April 3.

The annual banquet held in the Memorial Union ball room was attended by 154 persons. Adjourning to the auditorium, President T. W. Butcher, of the college, gave the address of welcome. This was followed by the annual address of the president of the academy, which was delivered by Dr. W. J. Baumgartner on the subject, "The Cell in Growth and Reproduction." The lecture, which was illustrated by slides and motion pictures of living cells, included much of the author's own research in the field of cytology. This address was followed by the annual invitation address by the Honorable William Allen White on the subject "Glimpses of the Orient."

Exhibits by educational supply firms and instrument dealers were a feature of the meeting.

Sectional meetings in botany, chemistry, physics, zoology, psychology and the junior academy were conducted on Friday afternoon, with continued sessions in zoology and psychology on Saturday morning. The entomology section met on Saturday after the academy business meeting. The program included 112 papers listed to be read and six presented by title. The total active membership at the time of the meeting was 386. A total of 65 joined the academy during the year, the net increase being 42. Two deaths during the year in the academy membership were reported: Dr. A. S. Hitchcock, an honorary member, and A. E. Oman.

The research fund of $75 from the American Association for the Advancement of Science will be augmented by $25 from the academy treasury for allotment during the coming year. This fund will be awarded by a special committee, consisting of Dr. L. D. Wooster, Hays; Dr. R. Q. Brewster, Lawrence, and Dr. J. C. Peterson, Manhattan. Dr. W. H. Schoewe reported progress in the committee on natural areas, particularly in regard to the movement to have a small area containing unusual rock formations near Minneapolis, Kansas, set aside for a state park.

A few advance copies of Volume 38, which is the *Transactions* for 1935, were distributed at the meeting. Especial credit for the success of the meetings was given to Frank Agrelius and J. B. Stroud, of the teachers college, who constituted the committee on arrangements.

The following officers were elected: *President,* Lawrence Oncley, Winfield; *First Vice-President,* George A. Dean, Manhattan; *Second Vice-President,* W. H. Schoewe, Lawrence; *Secretary,* Roger C. Smith, Man-

attan; *Treasurer,* H. A. Zinszer, Hays. *Additional embers to the executive council:* W. J. Baumgartner, awrence; H. H. Hall, Pittsburg; W. B. Wilson, ttawa. *Editorial board:* E. O. Deere, Lindsborg, nd W. W. Floyd, Ottawa. The following section hairmen were elected: J. H. Doell, Newton, botany; . E. Blackman, Emporia, chemistry; Louis R. Weber, Vichita, physics; F. C. Sauer, Wichita, zoology, ho, however, died of scarlet fever about a week after e academy meeting, and John Breukelman of Emoria was appointed to the chairmanship of this ection; Edwina A. Cowan, Wichita, psychology; onald A. Wilbur, Manhattan, entomology; and Iazel Branch, Wichita, junior academy. Frank C. ates continues as editor of the *Transactions.*

A new committee, consisting of O. W. Alm, Manattan, A. C. Carpenter, Ottawa, and Miss Dale Zeller, mporia, was appointed to study educational trends the secondary schools of the state with respect to e basic sciences.

The next meeting of the academy will be held at ansas State College, Manhattan, during the spring f 1937.

ROGER C. SMITH,
*Secretary*

## THE PENNSYLVANIA ACADEMY OF SCIENCE

THE twelfth annual meeting of the Pennsylvania cademy of Science was held at the State Teachers College, Indiana, Pennsylvania, on April 10 and 11. About 60 papers were presented and a number of demonstrations shown. The address by the retiring president, Professor Edgar T. Wherry, University of Pennsylvania, was entitled "Reflections on the Origin of Life." Following the annual dinner, Dr. Austin L. Patrick, regional conservator, Soil Conservation Service, U. S. Department of Agriculture, spoke on "Soil Erosion and its Control." A total of 90 registered for the meetings, besides about 40 who attended the junior academy.

The following officers were elected for 1936–1937: *President,* Dr. Thomas D. Cope (physics), University of Pennsylvania; *Vice-President,* Dr. George H. Ashley (geology), Pennsylvania Topographic and Geologic Survey; *Secretary,* Dr. V. Earl Light (biology), Lebanon Valley College; *Treasurer,* Professor H. W. Thurston (botany), Pennsylvania State College; *Assistant Secretary,* Charles E. Mohr (education), Reading Museum; *Editor,* Ralph W. Stone (geology), Pennsylvania Topographic and Geologic Survey; *Press Secretary,* Dr. Bradford Willard (geology), Pennsylvania Topographic and Geologic Survey.

The 1937 meeting is scheduled to be held at Franklin and Marshall College, Lancaster, Pennsylvania. The regular summer meeting, with botanic and geologic field trips, will take place at Somerset on August 14 and 15.

BRADFORD WILLARD,
*Press-Secretary*

# SPECIAL ARTICLES

## PLEISTOCENE ALLUVIAL STAGES IN NORTHWESTERN OREGON

SUFFICIENT progress has been made in the distinction of subdivisions of Pleistocene glacial alluvium the Pacific Northwest that it seems appropriate to ake an announcement for the benefit of workers in rcheology, pedology, vertebrate paleontology, stratigphy and physiography, and possibly other to whom e data may be useful. With present interest in the ossibilities of Pleistocene man in North America at igh pitch, the dating of Quaternary materials beomes particularly important. The following descripons apply primarily to Willamette Valley but are nown to be applicable to other areas in Oregon and Vashington.

Alluvial deposits corresponding to Kansan, Illiian and Wisconsin ages of glaciation in the Cascade ountains of Oregon and Washington are recognizble over wide areas. A few scattered remnants suggest another, yet older Pleistocene age, but as the deposits are rather local, limited to small areas on drainage divides, and are of uncertain importance, they may be dismissed briefly. An example is the gravel deposit on the hilltops in T. 6 S., R. 6 W., Polk County, Oregon. Their high topographic position, deep weathering and advanced degree of erosion suggest Early Pleistocene (Nebraskan ?) age. As a corollary of this interpretation the bulk of the andesitic lavas and pyroclastics of the Cascade Mountains must be pre-Pleistocene, probably Pliocene, and the fluviatile quartzite conglomerate near Troutdale, included by Bretz[1] in his Satsop formation, must be still older—perhaps the equivalent of the Miocene Ellensburg formation and the Hood River formation of Buwalda and Moore.[2]

The oldest of the well-defined Pleistocene stages is

[1] J Harlen Bretz, *Jour. Geol.,* 25: 446–458, 1917.
[2] J. P. Buwalda and B. N. Moore, SCIENCE, n.s., 66: 236, 1927.

represented by high gravel terraces along the valleys in the Cascade Mountains and by perched remnants along the margins of the Willamette Valley lowland. Sandy, Clackamas, Molalla, North Santiam, South Santiam and Middle Fork (of Willamette) river valleys still retain strips of notable size, and smaller areas occur in other areas on both sides of Willamette Valley. The Lebanon (Oregon) quadrangle alone includes about fifteen square miles of it. The terraces slope down from elevations of 1,000 to 1,500 feet or more above sea level in the mountain valleys to about 300 feet above sea level on the borders of the Willamette Valley lowland. Apparently the lowland also was once filled with similar materials that were removed during the subsequent interglacial age. The remaining deposits are mostly on resistant rock or in protected situations where the streams could not easily undercut and remove them. On account of dissection their surfaces are generally somewhat rolling. The deposits themselves are oxidized to depths of 20 to 30 feet along terrace fronts, and pebbles of basalt and andesite have been softened to clayey consistency to depths of 8 to 10 feet or more. Judged by their topographic position, the degree of their weathering and the amount of subsequent erosion, they are thought to be Kansan in age. Glacial drift of corresponding age is known along lower Sandy River Valley, for example, but the canyon forms of most valleys were unfavorable for the preservation of moraines.

The deposit next in order of age includes extensive, well-developed gravel terraces which spread out and coalesce as large alluvial fans as they emerged from the canyons onto the open lowland of the main valley floor. Especially notable fans were made by Molalla River near Molalla, North Santiam River west of Stayton, South Santiam River northwest of Lebanon, and by the headwaters of Willamette River proper north of Eugene. Glacial till of corresponding age occurs within 20 to 30 miles from the heads of the valleys, but morainal forms are not well preserved. The outwash terraces and fans of this age, however, have not been much eroded except as the major streams have cut wide trenches through them. The profile of these alluvial deposits descends from 425 feet above sea level near Eugene to 200 feet near Albany and to even lower elevations in the northern end of the valley where it passes beneath deposits of the succeeding stage.

The gravels of this age are irregularly oxidized to depths of 10 to 15 feet or more; the pebbles are entirely decomposed in the clayey soil zone and show exfoliating rinds at depths of several feet. The interstitial matter at even greater depths is altered sufficiently to restrict the flow of groundwater. In areas a claypan two to three feet thick occurs in the subsoil or extends downward between the partly weathered pebbles, thus resembling the gumbotil or gumbosand of the Illinoian glacial drift of south central Illinois. On the basis of this similarity of degree of weathering the deposits of this age may reasonably be correlated with the Illinoian subdivision of the Pleistocene.

The deposit next younger than the Illinoian is somewhat anomalous in its form and stratigraphic relations and distinctive in its petrographic character. It is shaped like a wedge which is thickest at the north. Toward the south and about the edges it overlaps older rocks to elevations between 350 and feet above sea level. The bulk of the material is and fine sand, but it also includes blocks and small fragments of foreign rocks such as granite and quartzite, that evidently were brought in by icebergs that came down glacial Columbia River.[3] That this deposit is distinct from that of the next previous age and merely a lowland phase of it is shown by the buried soil zone which commonly separates its silts from the underlying gravels. This relation is well shown, for example, in the banks of Willamette River near Peoria and Irish Bend, north of Harrisburg, Oregon. Furthermore, the silt when traced up-valley may be found not only to overlie the lower slopes of the Illinoian fans but also to form a bench within a trench previously eroded below the surfaces of these fans. Farther up-valley the bench continues intermittently as a gravel terrace between the Illinoian terraces and the present stream levels. The gravels of this terrace show ready permeability to groundwater. Extensive exposures of the typical silts occur along Willamette River, especially between Salem and Oregon City, and over extensive areas of the Willamette lowland. Most of the mammalian fossils reported from Willamette Valley seem to have been found in or on this deposit. The four to six feet depth of oxidation in aeration soils, the twelve to eighteen inch thickness of the claypan in wet areas, and the comparative freshness of the feldspathic erratics within the zone of weathering indicate that the deposit is probably not more than half as old as Illinoian, but must be Wisconsin in age. Glacial till of corresponding age is well shown in the vicinity of Brightwood in Sandy River valley west of Mt. Hood.

Within the trenches excavated by Willamette River and its tributaries through the Illinoian and Wisconsin alluvial deposits appears a low terrace which sl

[3] Ira S. Allison, *Bull. Geol. Soc. Amer.*, 46: 615-1935.

erally 15 to 30 feet above the streams, and slopes wn-valley in general accordance with them. Its both portions lie above the range of all but excepnal floods, but these smooth tracts are separated m each other and somewhat scored on top by true od channels. Active erosion occurs especially along se channels during floods so that the smooth tracts thought to be not a true floodplain of active viation but rather the remains of an earlier episode alluviation now undergoing removal. The scant athering of the material subsequent to its deposition shown by a youthful soil indicates that this low race plain is not older than late Wisconsin and be Recent. It is possibly to be correlated with eak stage of valley glaciation shown by fresh till an associated outwash plain near Zigzag on Sandy er, with a similar low terrace of fresh pumiceous vels in Cowlitz River Valley of southwestern shington, and with equivalent penultimate surfaces g the Columbia River and its tributaries. In ent time the streams have cut through this inner in or the earlier deposits, in many places to the erlying solid rock.

The air-laid pumice deposits of the Crater Lake d[4] which extend into the upper end of the Willate drainage basin overlie the youngest moraines of area and are clearly post-glacial, both by position by feeble soil development.

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## ESH-WATER JELLY-FISHES IN ILLINOIS[1]

N recent years there have been many records of the urrence of fresh-water jelly-fishes in the eastern ited States, but the occurrences seem to be sporadic the species does not seem to become permanently blished. Though known from adjoining states re has been no previous record of Craspedacusta in nois. The object of this note is to make available instances which have come to my attention. Mr. n Cralley has sent me specimens of Craspedacusta m near Carmi in White County, Illinois. He rets that they were found in a concrete fish and lily d filled from the Carmi water system. The pool sisted of two approximately circular basins, each to twelve feet in diameter and three feet deep, nected by a narrow channel. Plants, including ter lilies and water hyacinths, had been introduced the water was stocked heavily with goldfish.

elly-fishes were found on August 8, 1933. When discovered they were abundant and remained so il about September first, disappearing entirely ut September 20. Specimens transferred to balanced aquaria remained alive for two weeks. In the two succeeding summers the pool has been closely watched, but no jelly-fishes have been found.

Preserved individuals submitted to the writer have been compared with specimens from two lakes in Indiana, and from Gatun Lake, Canal Zone, and have been found identical in all important characters. Hence they have been identified as *Craspedacusta sowerbyi*.

Another Illinois record of Craspedacusta which has not been published is based on a series of observations by Mr. D. J. O'Donnell. On September 5, 1932, Mr. O'Donnell found jelly-fishes in a rock-garden pool in Vandalia, Fayette County, Illinois. This pool is of concrete construction, irregular in shape, about fifteen by seven feet and three feet deep. It is fed through a spray head from the Vandalia water system. Medusae were first noticed in this pool in the summer of 1931, about two months after water lilies, from a St. Louis dealer in supplies for tropical aquaria, had been introduced. The pool was drained for winter, but medusae reappeared in the summer of 1932. Mr. O'Donnell recorded the presence of medusae on September 5, 1932, and later observed that on September 20 they had disappeared.

In both of these instances at Carmi and at Vandalia in southern Illinois it seems probable that the medusae were carried into the small artificial pools along with introduced aquatic plants. This supposition is strengthened by the fact that though the water supply of both of these communities is derived from adjacent rivers, in both instances the water passes from settling tanks through filters before entering the supply mains.

It has been the belief of the present writer that Craspedacusta is more abundantly represented than records of its occurrence might indicate. Observers not directly acquainted with these medusae might readily overlook them. For several years students in field zoology in the University of Illinois have been warned to be on the lookout for Craspedacusta. The two instances here recorded are gratifying illustrations of directed attention yielding results.

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## THE BIOLOGICAL EFFECTS OF THYMECTOMY IN SUCCESSIVE GENERATIONS OF RATS[1]

IN a previous communication, attention was called to the accruing acceleration in the rate of growth and

[4] B. N. Moore, *Jour. Geol.*, 42: 358–375, 1934.

[a] Contributions from the Zoological Laboratory of the University of Illinois, No. 481.

[1] From the Samuel Bell, Jr., Laboratory of the Philadelphia Institute for Medical Research in the Philadelphia General Hospital. This work was supported by a grant from the Penrose Fund of the American Philosophical Society. Part of thesis studies submitted by N. H. Einhorn to the Faculty of the Graduate School of Medicine of the University of Pennsylvania in partial fulfilment of the requirements for the degree of doctor of medical science, Sc.D. (Med.).

development when successive generations of rats were given daily intraperitoneal injections of 1 cc of potent thymus extract (Hanson). It would seem likely that if an excess of thymic tissue or extract resulted in acceleration in the rate of growth and development in the young, removal of the gland from successive generations of parents should result in retardation in growth and development in the offspring.

Accordingly, four pairs of animals were thymectomized under ether anesthesia. When possible the thymus gland was removed intact. Occasionally, however, it divided into its two lobes and each was removed separately. No animal was closed until it was thought that the entire thymus gland had been removed.

The earliest age at which animals were thymectomized was 17 days, the latest 24 days, the determining factors being the condition of the animals and whether or not they could be successfully weaned. All the surviving rats were weaned between the ages of 21 and 28 days. Occasionally, weaker animals were returned to their mothers post-operatively for a few days before being weaned.

In order to control more accurately the results in the offspring of thymectomized animals, a study was made of a special group of rats whose parents were subjected to the surgical technique concerned in thymectomy but in whom the thymus gland was not actually removed. This group showed no significant deviation from normal controls.

To date, five successive generations of the thymectomy strain have been observed. An analysis of the biological data of each of these generations reveals significant facts. In the first generation, no effect on weight or on growth was noted. However, litters were cast earlier, and more frequently than normal; the litters were large, the offspring at birth strong, healthy and of good size. In the second generation, a definite retardation in growth was noted between the tenth and thirtieth days of life, reaching its maximum of 14 per cent. at the age of 30 days. In the third generation, this retardation in growth was greater than in the second, reaching a maximum of 29 per cent. at the age of 30 days. In the fourth and fifth generations, retardation in growth occurred, although this was not as marked at 30 days as in the preceding generations, but became more evident at 70 days. In addition to their underweight, the test animals of the second to the fifth generations were shorter in stature between the ages of 20 and 30 days.

From the second to the fourth generations, no uniform or marked retardation in the opening of the ears, the eruption of the teeth, the development of fur, the opening of the eyes, the descent of the testes, or the opening of the vagina was noted, although these somatic changes often appeared at the outer limits of the normal range or just beyond it. However, in the six litters which have been observed in the fifth generation, a slight but definite delay in development has been noted; for example, in four of the six litters, the teeth erupted late, on the ninth day instead of on the eighth day, and in two on the tenth day. In two of the litters, the eyes opened on the seventeenth day and in one litter on the nineteenth day, instead of on the fifteenth day. The time of appearance of these somatic changes indicates slight but definite delay in development.

The effect of thymectomy on the rate of growth is revealed in Fig. 1, which represents the average

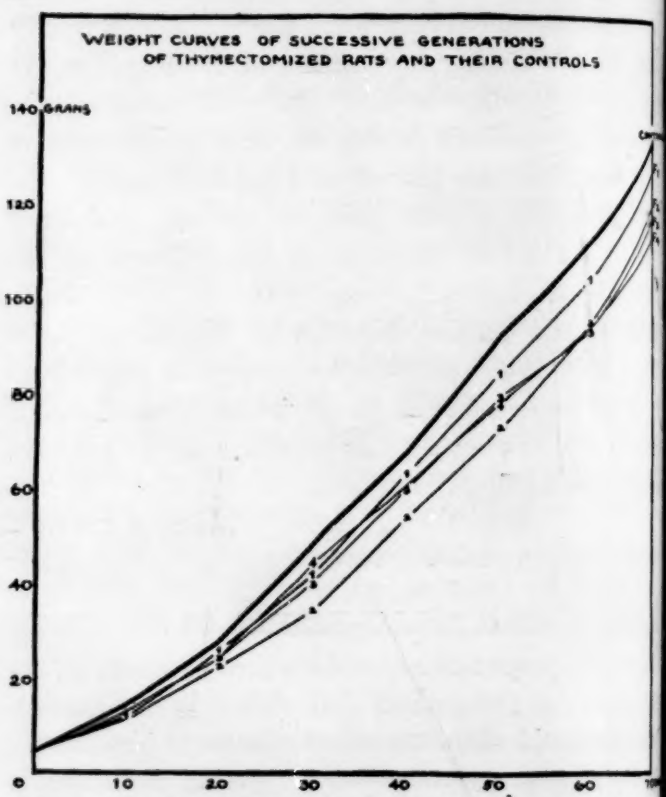


FIG. 1. The number of rats constituting the basis for the weight curves is as follows: For the controls 199 rats; for the $F_1$ generation, 191 rats; for the $F_2$ generation, 160 rats; for the $F_3$ generation, 166 rats; for the $F_4$ generation, 40 rats.

growth curves of all the young of four successive generations of rats subjected to thymectomy. Reference to this figure shows that the retardation in growth is greatest between the ages of 10 to 50 days. At 70 days, the average weight of the thymectomy test strain in all 4 generations is still below the average weight of the operated controls, but at 120 days the weights of the test and control groups are practically identical. It can also be seen in Fig. 1 that at the end of the 70-day period of observation of the young, the average weight curves of successive generations show an accruing retardation in growth.

In Table 1 is presented briefly the significant biological data on somatic development. Although the

TABLE 1

SOMATIC DEVELOPMENT IN SUCCESSIVE GENERATIONS OF THYMECTOMIZED RATS SHOWING RANGE AND AVERAGE VALUES

| | Teeth erupted | Eyes opened | Testes descended | Vagina opened |
|---|---|---|---|---|
| Controls .... | 7–9 (8.2) | 13–16 (15) | 25–33 (28.6) | 41–50 (44.5) |
| $F_1$ ..... | 8–10 (9.3) | 13–18 (15.9) | 24–38 (30.4) | 40–53 (45.1) |
| $F_2$ ..... | 8–10 (9.5) | 15–18 (16.2) | 24–36 (30.7) | 42–61 (46) |
| $F_3$ ..... | 8–10 (9.6) | 15–18 (16.3) | 26–33 (30.3) | 41–52 (46.5) |
| $F_4$ ..... | 9–10 (9.3) | 16–19 (17) | 30–33 (31) | 44–48 (46) |

is no marked retardation, it is seen that these somatic changes occurred at the outer limits of the normal or just beyond it.

From the foregoing data, based on a study of 555 rats in four successive generations of offspring of thymectomized parents, it is evident that thymectomy has resulted in retardation in the rate of growth and in a slight delay in the rate of development.

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## GROWTH STIMULATING PROPERTIES OF GRASS JUICE

IN earlier studies on the nutritive value of milk produced at different seasons of the year[1,2] it was found that milk produced on summer pasture had a higher nutritive value, as measured by growth of young rats, than milk produced under winter-feeding conditions. At that time we made this statement, "The significance of these studies lies in the relation of fresh plant tissue as contrasted with field dried material to subtle changes in the milk secreted." More recent and direct studies have confirmed this point of view. Young rats, fed a mineralized milk produced on winter rations and giving an average daily growth of the male of about 2 grams, grew at the rate of 4+ grams per day when the daily allowance of the whole winter milk was supplemented with three cc of fresh, clear grass juice (principally Kentucky blue grass). See the chart for this record.

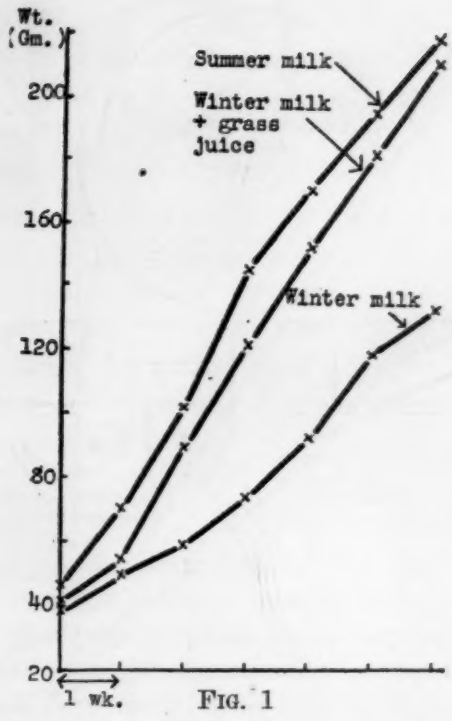


FIG. 1

Studies on the characterization of the factor or factors responsible for this growth response are now in progress. It is evident that in this fresh tissue there are important water-soluble substances which contribute to the difference between the nutritive value of summer and winter milks, and are directly stimulating to growth when added to a winter milk.

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# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## A DEVICE FOR COPYING SINGLE SOUNDS FROM A PHONOGRAPH RECORD OF SPEECH OR MUSIC

INVESTIGATORS in the psychophysics of speech and music frequently find it desirable to reproduce single speech sounds or individual musical tones in isolation from the performances in which they occur. The present paper describes an electrical and mechanical technique, developed in the Psychological Laboratories of the State University of Iowa, which makes it possible to copy from a phonograph record single sounds of short duration.

The essentials of the apparatus are: (1) Phonograph recording equipment, including an amplifier and two constant speed, 78 r.p.m. turntables, one for cutting and the other for playback; (2) a photoelectric relay; (3) a 32 c.p. light source; and (4) two shields of thin galvanized iron. The shields are shaped as in A, Fig. 1, and are designed to be placed upon the playback turntable, their inner diameters being equal to that of the latter. In position, as shown in side view at B, Fig. 1, they form a one-inch projection beyond the rim of the turntable, C. The projection is capable of being varied in length from 180° to 360° of the circumference of the turntable. As the turntable revolves, the projection interrupts periodically the light from a 32 c.p. lamp, D, placed beneath the projection. When not interrupted, light

[1] C. A. Elvehjem, E. B. Hart, H. C. Jackson and K. G. Weckel, *Jour. Dairy Science*, 17: 763, 1934.
[2] F. E. Stirn, C. A. Elvehjem and E. B. Hart, *Jour. Dairy Science*, 18: 333, 1935.

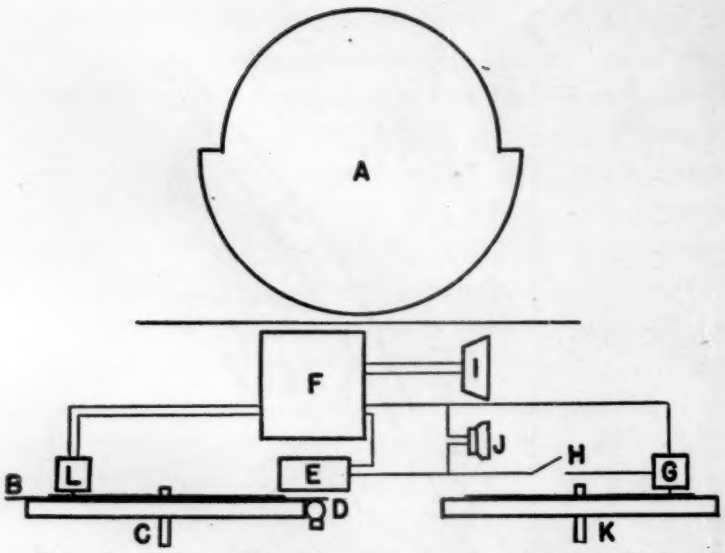


FIG. 1. Schematic of apparatus for copying isolated sounds from a phonograph record. A, shape of shield; B, projecting portion of shield; C, playback turntable; D, 32 c.p. lamp; E, photoelectric relay; F, amplifier; G, cutting-head; H, switch; I, loud speaker; J, head-phones; K, cutter turntable; L, electric pick-up.

from this lamp falls upon the cell of the photoelectric relay, E. The relay is put across one side of the line conducting the output of the amplifier, F, to the cutting-head, G, and is adjusted to close the circuit when the cell is activated. A switch, H, also breaks the circuit.

The original phonograph record is placed on top of the shields, played into the amplifier and heard in its entirety in the loud speaker, I, while the line from the relay to the cutter is tapped by a pair of head-phones, J. The shields are adjusted until the sound selected for recording is heard in the head-phones as one of the intermittent tones admitted by the relay. This selected portion is recorded in isolation by closing the switch, H, during the interval which immediately precedes the sound, and by opening it as soon as the sound has been cut.

With the present apparatus sounds of duration less than .39 sec. are recorded conveniently. Sounds of longer duration may be recorded with the same arrangement by decreasing the length of the projecting portion of the shields or by mounting the shields, relay and light upon a slower speed turntable than that used for playing the original record. In psychophysical work which does not demand the presentation of stimuli in rapid succession, the device may be adapted to any electric phonograph and used without recording the sounds.

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## DEMONSTRATION APPARATUS FOR SMALL INSECTS

THE apparatus here described has proved useful for the public exhibition of small biological specimens. A six-foot model was in use as part of the recent Vermont Conservation Commission's exhibit at the Sportsman's Show in Burlington and attracted a great deal of interest. The apparatus in this instance was used to display specimens of insects which form an important part of the food of the brook trout. By the use of ten lenses of several sizes fifteen different forms were shown.

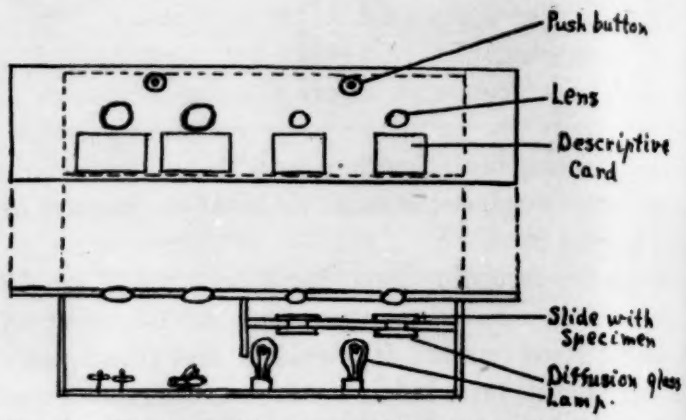


FIG. 1. Top and side views of demonstration apparatus.

The apparatus consists primarily of a box into the upper lid of which the lenses are fastened; the illumination is furnished by fifteen-watt electric lamps which can be turned on by the observer by pushing a button mounted on the lid by the lens. Large objects, such as adult insects, are illuminated with indirect light, and a reading glass lens of about a six-inch focal length is used to magnify them. Small objects, such as larvae, which one would ordinarily examine under a dissecting microscope, are mounted on a baffle board close to a dissecting lens. Light passes up through a small hole in the baffle board. It was found that best results were obtained when the opening on the lower side of the board was covered by a piece of opal glass which helps to diffuse the light without cutting down its intensity too greatly. The push button control of the lights eliminates the danger of overheating and the consequent destruction of balsam preparations. Descriptive labels placed beside the lenses help to convey the story to the layman observer.

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## BOOKS RECEIVED

CROWTHER, J. G. *Soviet Science.* Pp. x + 342. 15 plates. Dutton. $4.00.

KELWAY, PHYLLIS. *Hedge Folk in Twilight.* (Field mice, dormice, shrews, hedgehogs, owls). Pp. xi + 178. 21 plates. Longmans, Green. $2.50.

SOUTHWELL, R. V. *An Introduction to the Theory of Elasticity; For Engineers and Physicists.* Pp. viii + 509. 120 figures. 3 plates. Oxford University Press. $10.00.

SUTTON, RICHARD L. AND RICHARD L. SUTTON, JR. *An Introduction to Dermatology.* Second edition. Pp. xvi + 566. 190 figures. Mosby. $5.00.